

Africa and Europe

Facts and Figures on
COVID-19 Vaccination

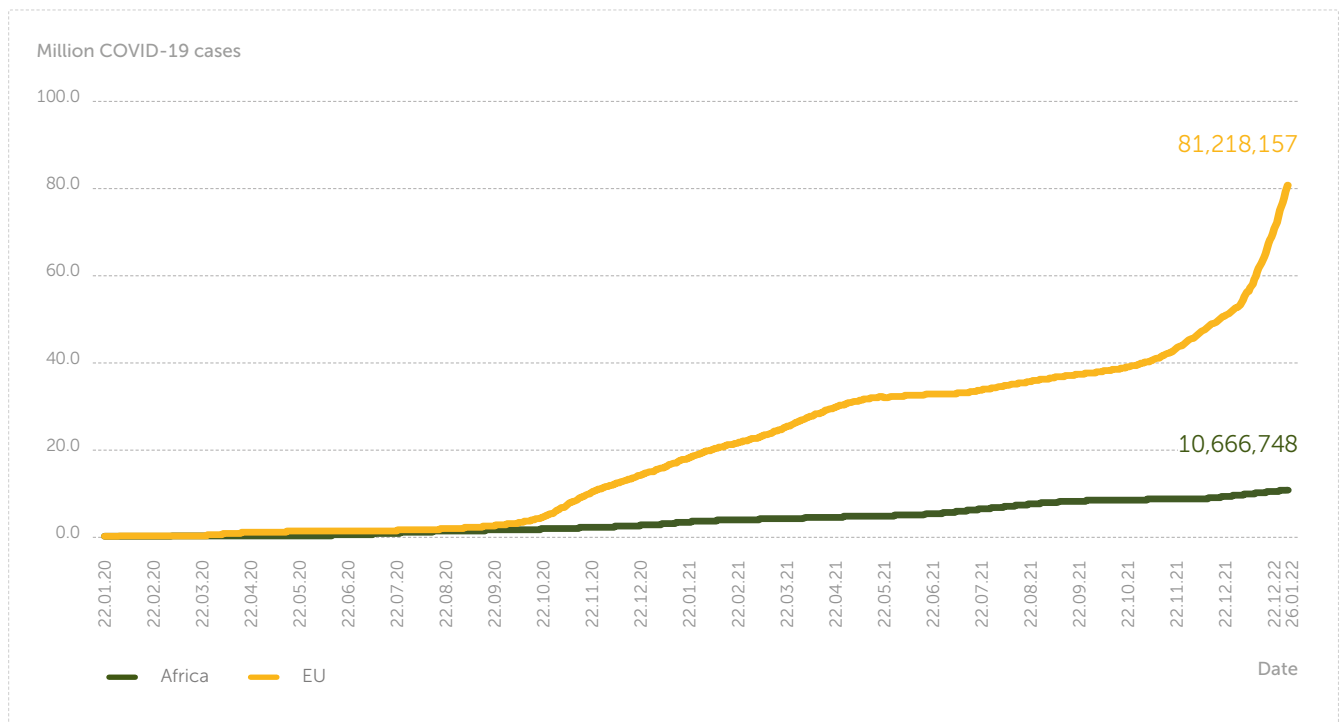
1. The COVID-19 pandemic toll in Africa: Africa hit milder?

Africa much less hit than Europe

As of 26/1/2022, cumulative COVID-19 cases per 1 million population are nearly 25 times higher in the European Union (EU) than in Africa

- 10.7 million COVID-19 registered cases in the 54 African countries (for a population of over 1400 million), compared to the 81.2 million in the 27 EU countries (for a population of 445 million).

Africa & EU: cumulative confirmed COVID-19 cases
(22 January 2020 - 26 January 2022)



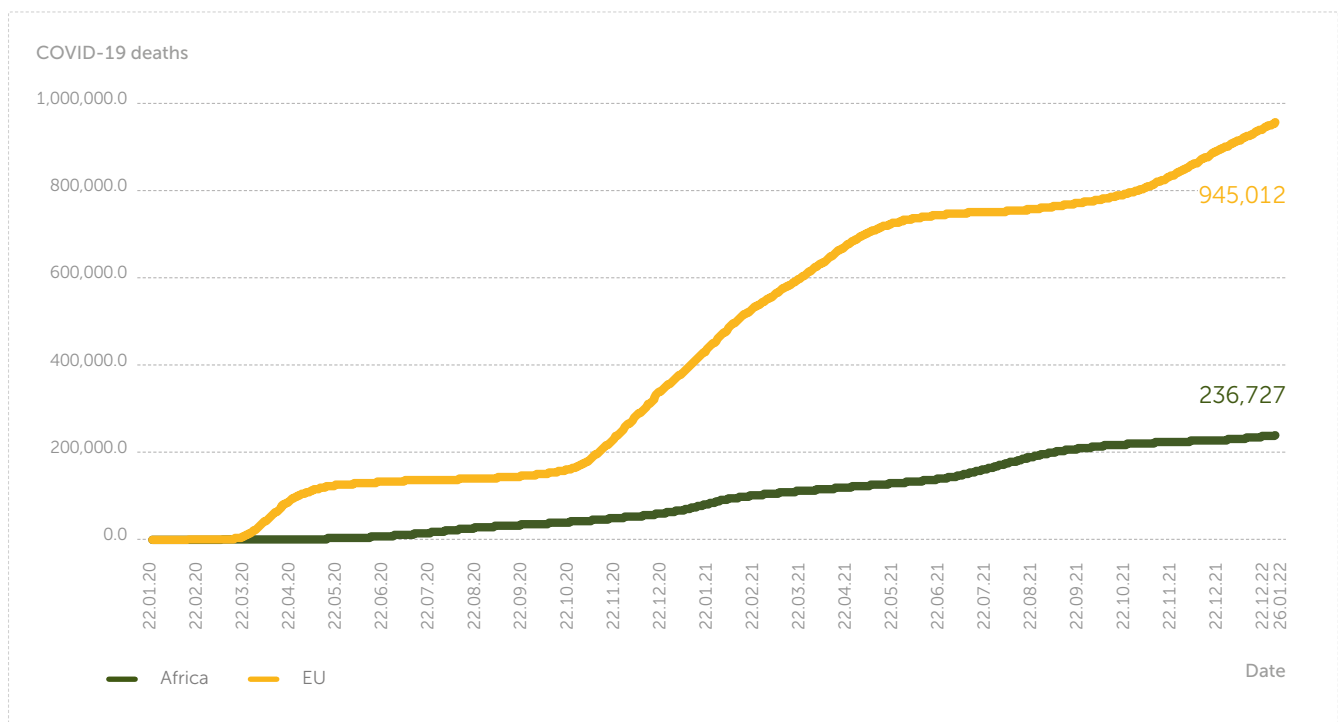
Source: MIF based on JHU CSSE

- While home to 17.7% of the global population, Africa's share of cumulative COVID-19 cases only amounts to 2.9% of global cases. Comparatively, while home to 5.6% of the global population, EU accounts for 22.4% of global cases.

Cumulative COVID-19 deaths per 1 million population are nearly thirteen times higher in the EU than in Africa

- 236,727 cumulative deaths in Africa, compared to 945,012 in the EU.
- With a population that is more than three times larger, Africa only accounts for 4.2% of global cumulative COVID-19 deaths compared to 16.8% in the EU.

Africa & EU: cumulative reported COVID-19 deaths (22 January 2020 - 26 January 2022)



Source: MIF based on JHU CSSE

But the impact of COVID-19 in Africa may be greatly under-estimated: according to World Health Organization (WHO), about only one in seven COVID-19 infections are being detected in Africa

- According to WHO only 14.2% - about one in seven- COVID-19 infections are being detected in Africa.
- Furthermore, WHO seroprevalence studies in 11 African countries estimated that in fact up to **about 68% of the population could have some conferred COVID-19 immunity (as of September 2021).**

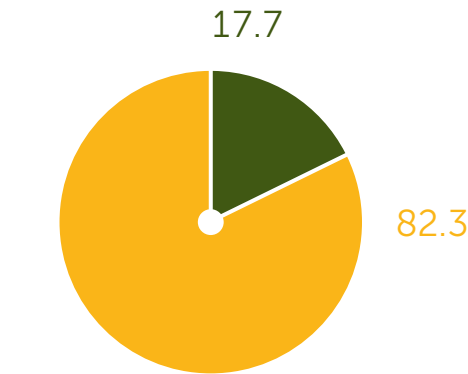
2. Vaccine inequity: Africa’s population vaccination rate is barely over 10%, compared to 72% in EU

According to WHO, 70% of population should be vaccinated by end of 2022 to reach immunity level

- Under current vaccine rollout projections, it is estimated that most African countries will not achieve mass immunisation until 2023. In the continent’s poorest countries, it may not even be reached until 2024.

As of 27/1/2022, COVID-19 vaccine doses administered in Africa account for less than half of the amount administered in the EU, for a population that is more than three times larger

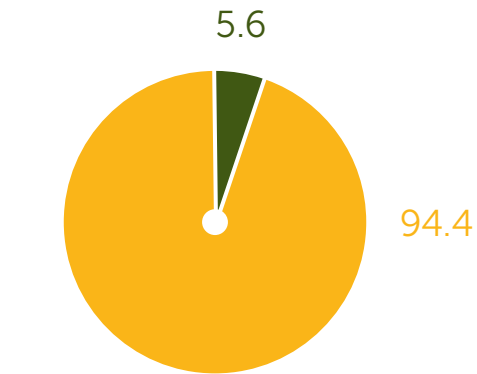
Share of global population (2022): Africa



● Africa population (%)
● Rest of the world population (%)

Source: MIF based on UNDESA

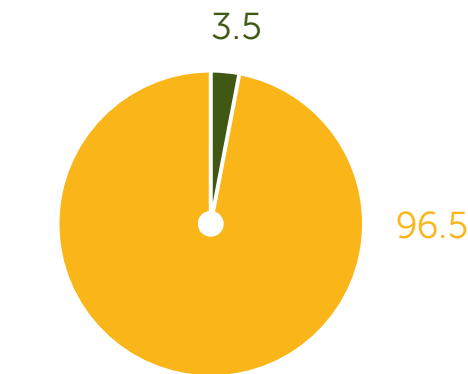
Share of global population (2022): EU



● EU population (%)
● Rest of the world population (%)

Source: MIF based on UNDESA

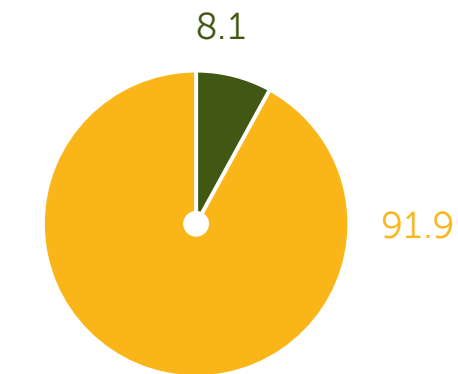
Share of COVID-19 vaccine doses administered globally (27 January 2022): Africa



● Vaccine doses administered in Africa (%)
● Vaccine doses administered in the rest of the world (%)

Source: MIF based on Bloomberg

Share of COVID-19 vaccine doses administered globally (27 January 2022): EU

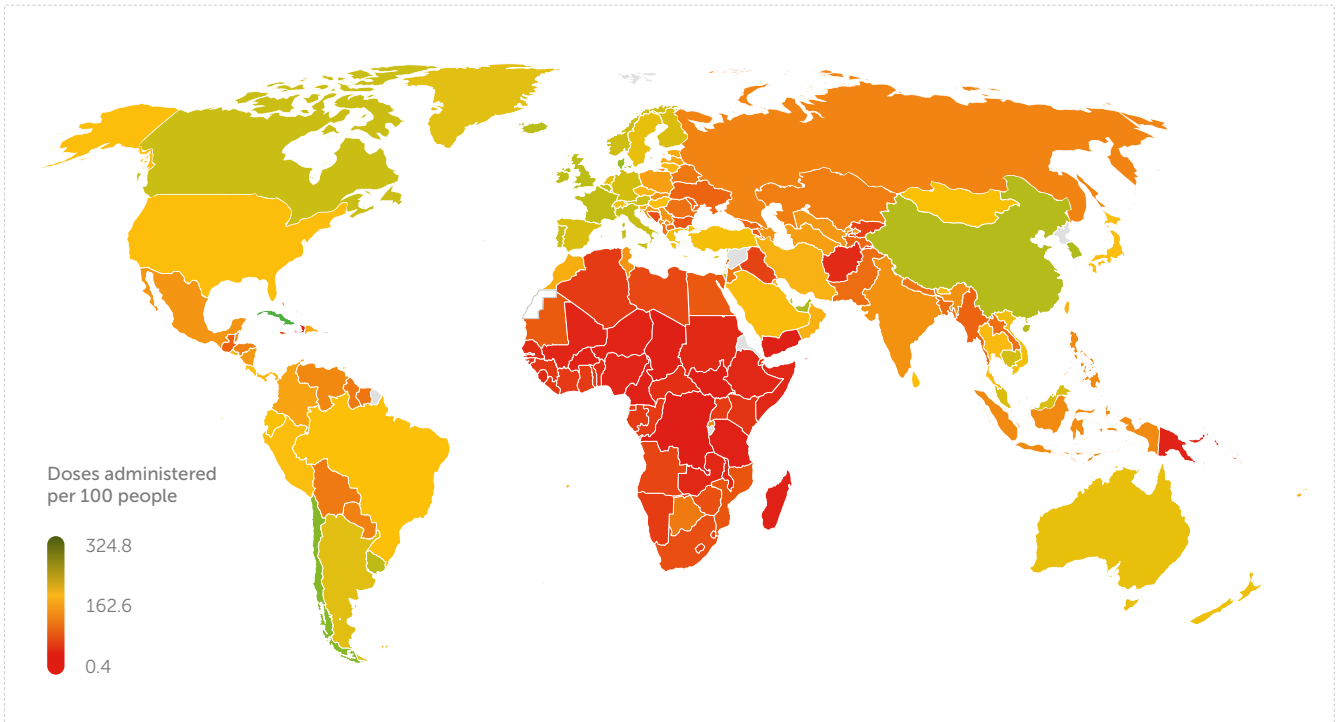


● Vaccine doses administered in the EU (%)
● Vaccine doses administered in the rest of the world (%)

Source: MIF based on Bloomberg

COVID-19 vaccine doses administered per 100 people globally: Africa by far the last

World countries: COVID-19 vaccine doses administered (27 January 2022)



Source: MIF based on Bloomberg

- For the 52 African countries with data available, the average currently stands at 40.2 doses per 100 people, and the median at 27.4, compared to an average of 171.9 and a median of 188.3 for the EU.

African countries: COVID-19 vaccine doses administered per 100 people

Seychelles	196.7
Mauritius	160.8
Morocco	144.3
Rwanda	126.5
Tunisia	119.1
Cabo Verde	109.8
Botswana	94.2
São Tomé and Príncipe	69.3
Comoros	64.8
Egypt	62.3
Mozambique	61.0
Mauritania	58.3
Zimbabwe	49.5
South Africa	49.4
Angola	44.9
Libya	44.6
Eswatini	40.8
Lesotho	33.9
Guinea	33.3
Ghana	32.5
Equatorial Guinea	32.4
Uganda	30.6
Togo	30.4
Namibia	30.3
Algeria	29.3
Côte d'Ivoire	27.8
Gabon	26.9
Liberia	24.4
Kenya	24.0
Guinea-Bissau	23.1
Djibouti	21.0
Central African Republic	18.7
Benin	17.6
Congo Republic	16.2
Gambia	14.5
Senegal	14.1
Zambia	12.2
Sudan	11.8
Sierra Leone	11.6
Ethiopia	11.3
Somalia	10.7
Nigeria	9.4
Malawi	9.1
Mali	8.4
Niger	7.3
Burkina Faso	6.0
Tanzania	4.2
Cameroon	3.9
Madagascar	3.4
Chad	2.3
South Sudan	2.3
DR Congo	0.4

Five best performers

Five worst performers

5 European Union countries with the highest number of COVID-19 vaccine doses administered per 100 people

Malta	233.3
Denmark	232.6
Italy	210.4
France	207.7
Belgium	207.5

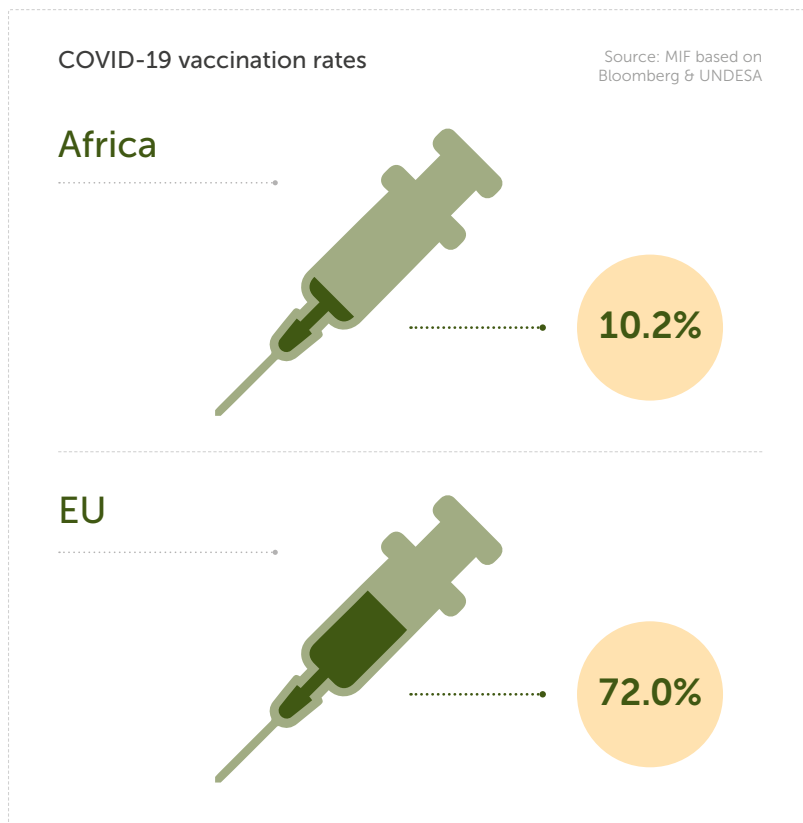
5 European Union countries with the lowest number of COVID-19 vaccine doses administered per 100 people

Bulgaria	59.5
Romania	84.5
Slovakia	123.0
Croatia	125.0
Poland	134.2

Source: MIF based on Bloomberg

Only seven out of 54 African countries have reached the 2021 year-end WHO target of fully vaccinating 40% of their people¹, compared to 26 out of the 27 EU countries²

Africa & EU: fully vaccinated population (27 January 2022)

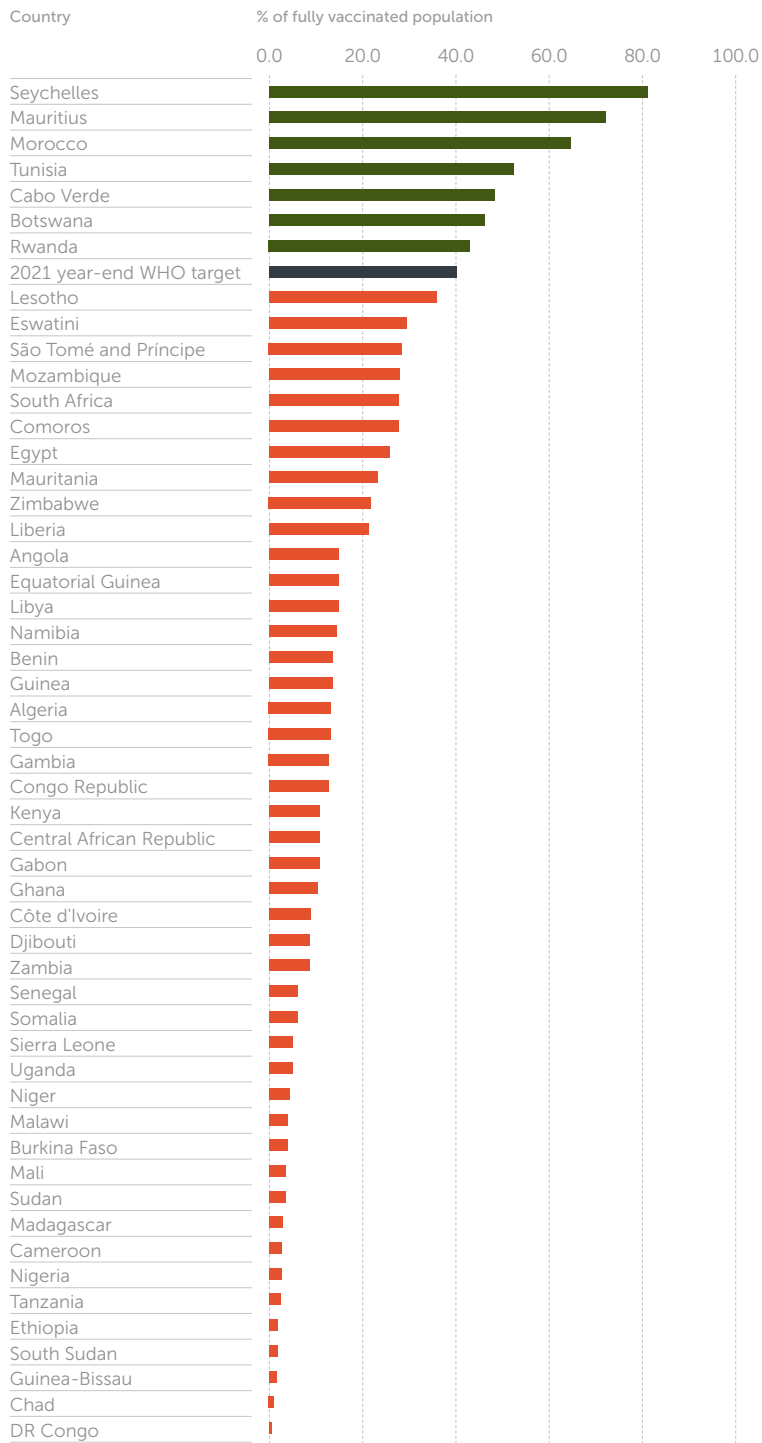


Note: Whereas the % of fully vaccinated population in the EU is provided at source (Bloomberg Covid-19 Vaccine Tracker), this is not the case for Africa. MIF has calculated this using the Completed Vaccination values for the 54 African countries available in Bloomberg's dataset, as well as the medium variant estimates for total population in 2022 available in UNDESA's 2019 Revision of World Population Prospects.

¹ Seychelles (81.0%), Mauritius (71.8%), Morocco (64.4%), Tunisia (52.1%), Cabo Verde (48.1%), Botswana (46.0%) and Rwanda (42.9%).

² Only Bulgaria (28.6%) has missed the target.

African countries: fully vaccinated population (27 January 2022)

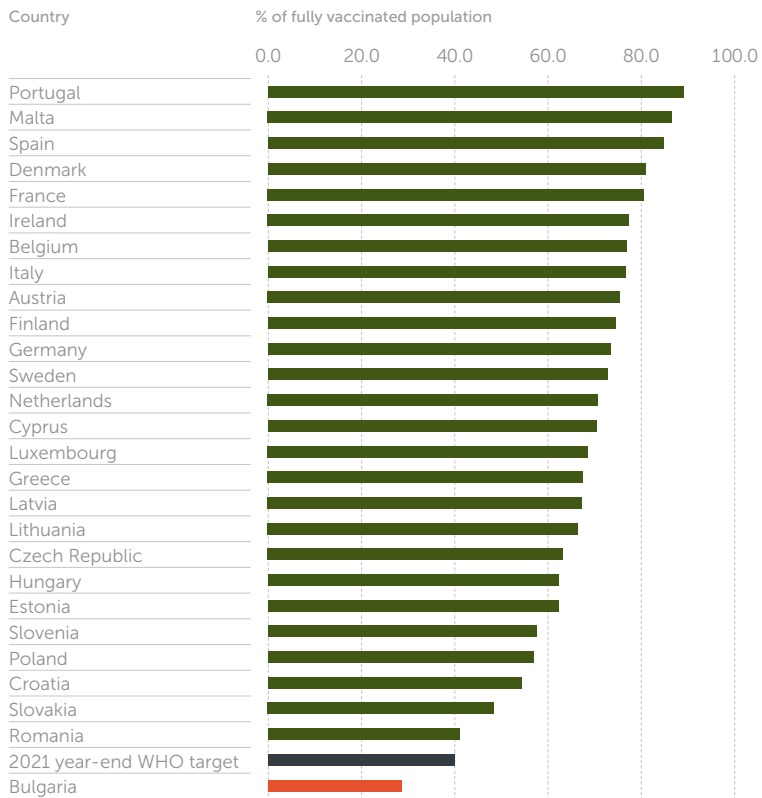


Source: MIF based on Bloomberg

Note: To be considered fully vaccinated, one or two doses may be required depending on the brand of vaccine.

- Only Seychelles and Mauritius have achieved the mid-2022 target of fully vaccinating 70% of their population, compared to more than half (14) of EU countries.

EU countries: fully vaccinated population (27 January 2022)



Source: MIF based on Bloomberg

Note: To be considered fully vaccinated, one or two doses may be required depending on the brand of vaccine.

As of 27/1/2022, booster doses in the EU amount to more than half the total doses administered in Africa

- While 42.5% of the EU population have received a booster dose, only four African countries have data available on booster doses administered: Tunisia (8.5% of the population), Rwanda (6.5%), South Africa (0.8%) and Kenya (0.2%).

3. The immediate challenge: level up Africa's population COVID-19 vaccination rate

The COVID-19 vaccine global landscape: 140 vaccines in clinical development

As of 25/1/2022, 140 COVID-19 vaccines are currently in clinical development, with ten of them already in the phase 4 of human clinical trials.

Manufacturers of COVID-19 vaccines in clinical development phase 4

Phase 4 COVID-19 vaccine manufacturers				
Manufacturer	Country	Market Cap	Revenue	Revenue
		(as of 27 January 2022)	(quarterly, 2021)	(annual, 2020)
		\$ Billion	\$ Million	\$ Million
Johnson & Johnson (NYSE)	US	450.2	24804.0 (Q4)	93775.0
Pfizer Inc. (NYSE)	US	304.7	24094.0 (Q3)	41908.0
AstraZeneca PLC (NasdaqGS)	UK	184.9	9866.0 (Q3)	26617.0
Shanghai Fosun Pharmaceutical (Group) Co., Ltd. (HKSE)	China	125.0	1587.2 (Q3)	4741.9
Moderna, Inc. (NasdaqGS)	US	61.5	4969.0 (Q3)	803.4
Sinopharm Group Co Ltd (HKSE)	China	53.1	20777.6 (Q3)	71752.0
Medigen Vaccine Biologics Corporation (Taipei Exchange)	Taiwan	53.9	44.8 (Q3)	0.4
CanSino Biologics Inc. (HKSE)	China	51.9	161.0 (Q3)	2.9
BioNTech SE (NasdaqGS)	Germany	37.6	6825.7 (Q3)	540.8
Dynavax Technologies Corporation (NasdaqCM)	US	1.5	108.3 (Q3)	46.6
Sinovac Biotech Ltd. (NasdaqGS)	China	0.6	NA	NA

Note: Currency amounts that were not available in US Dollars at source were converted to US Dollars using the currency conversion rates available on 31.01.2022.

Source: MIF based on Bloomberg & Yahoo! Finance

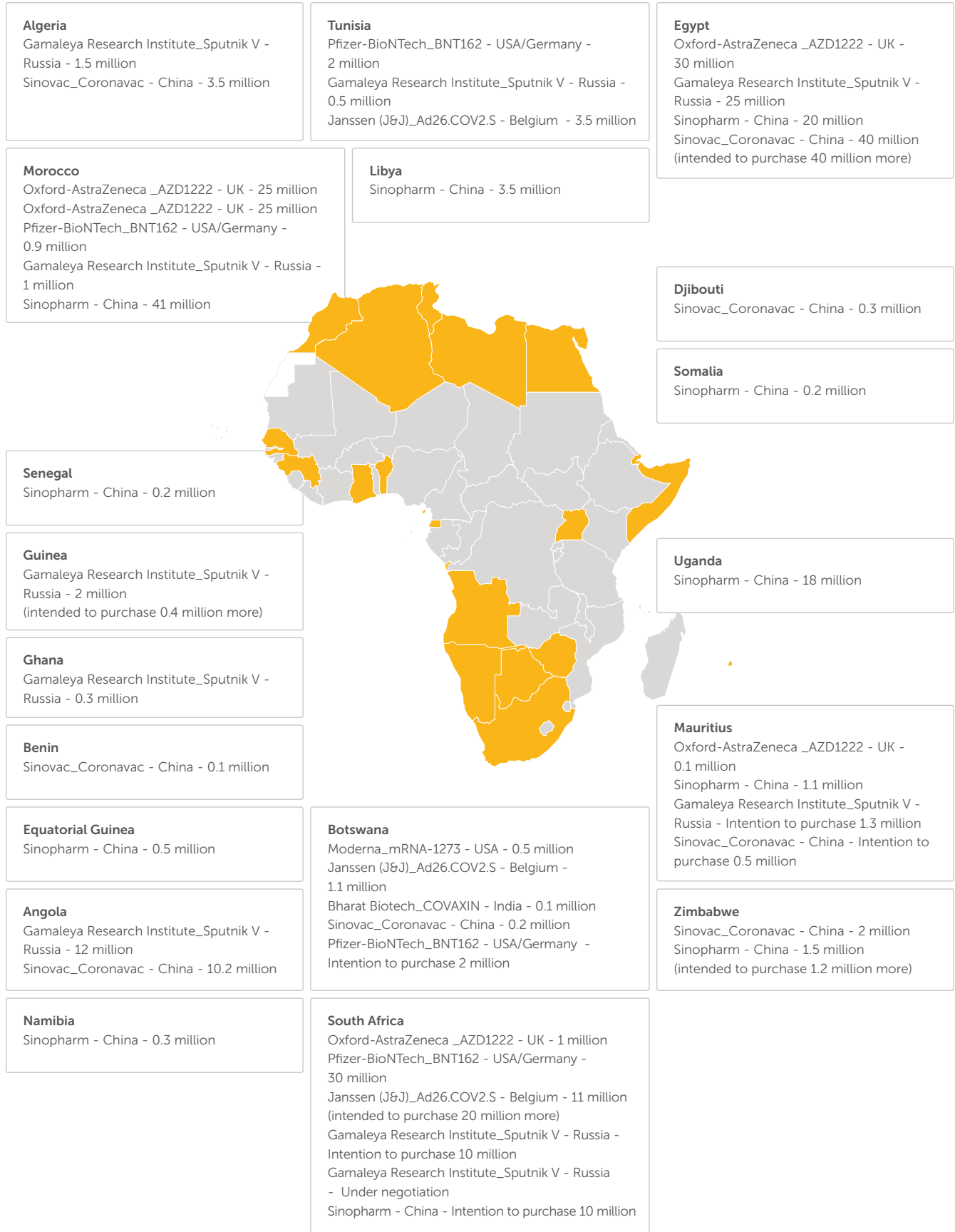
COVID-19 vaccines availability in Africa: confirmed procurement doses currently cover almost half of the population

- As of 21/1/2022, COVID-19 vaccine purchasing deals add up to 645.0 million confirmed procurement doses, plus 265.5 potential procurement doses
- **Bilateral** purchasing deals made by 19 African countries amount to 315.0 million confirmed procurement doses, plus 85.4 million potential procurement doses.
- Purchases made at **continental** level amount to 330 million confirmed procurement doses, plus 180 million potential procurement doses.

Development phases for candidate vaccines in human clinical trials

- Phase 1: test the vaccine's safety, determine dosages and identify any potential side effects in a small number of people.
- Phase 2: further explore the vaccine's safety and start to investigate efficacy on larger groups.
- Phase 3: confirm and assess the effectiveness of the vaccine on thousands or tens of thousands of people and test whether there are any rare side effects that only appear in large groups.
- Phase 4: once the vaccine candidate is approved by the national regulator, further monitor in a wide population over a longer time frame as a form of post-marketing surveillance (pharmacovigilance).

African countries: COVID-19 vaccine bilateral purchasing deals (21 January 2022)



Note: This information comes from public sources, may not be comprehensive, and the source has not confirmed it directly with manufacturers or purchasers.

Source: MIF based on Duke Global Health Innovation Center

The African Vaccine Acquisition Task Team (AVATT)

The African Vaccine Acquisition Task Team (AVATT) was established in August 2020 by the African Union (AU) as the African entity responsibly for leading the continent's COVID-19 vaccination strategy.

- The direct acquisition of vaccines by African countries through the AVATT initiative is part of the continental objective to vaccinate a minimum of 60% of the African population. **Through the COVID-19 procurement agreement signed on 28 March 2021, African countries now have access to 400 million doses of the Johnson & Johnson single-shot COVID-19 vaccine.**
- AU member states can place online orders for their vaccines allocation through the Africa Medical Supplies Platform (AMSP).
- The Afreximbank facilitates payments by providing advance procurement commitment guarantees of up to \$2 billion to the manufacturers on behalf of the member states.
- Regarding the longer-term objective of manufacturing of vaccines, AVATT will also potentially play a key role via institutionalising and leveraging pooled demand arrangements.

Sharing doses: EU's strong commitment, but delivery bottlenecks

In December 2020, under the strong impulsion of the European Commission, France, WHO and the Bill & Melinda Gates Foundation, the ACT-A (Access to COVID-19 Tools Accelerator) was created as a global collaboration mechanism to accelerate the development, production, and equitable access to COVID-19 tests, treatments, and vaccines.

COVAX

- As the vaccine pillar of ACT-A, COVAX is co-managed by GAVI, the Vaccine Alliance, the Coalition for Epidemic Preparedness Innovations (CEPI) and the WHO.
- The COVAX Facility is the global procurement mechanism of COVAX that pools purchasing power from all participating countries and seeks to ensure equitable allocation of vaccines. The majority of high- and middle-income countries have committed to funding, while joining lower-income countries are to be covered as funded countries.
- COVAX's primary focus is to ensure that the 92 middle- and lower-income participating countries that cannot fully afford to pay for COVID-19 vaccines get the same access to COVID-19 vaccines as higher income self-financing countries and at the same time.
- According to the COVAX Global Supply Forecast published in December 2021, **while the global vaccine-sharing scheme aimed at having made 2 billion doses available by the end of 2021, it missed its delivery target. As of 17 January 2022, COVAX has only shipped over 1 billion COVID-19 vaccines to 144 participants.**
- **The EU is lead contributor to the COVAX Facility**, with Team Europe having allocated over €3 billion as of 6 December 2021.

The "Team Europe" approach combines resources from the EU, its member states, and financial institutions, in particular the European Investment Bank and the European Bank for Reconstruction and Development.

Team Europe's commitment to share vaccine doses: still almost half to be shipped?

- At global level,
 - To reach 70% of global vaccination, Team Europe has committed to donate 700 million COVID-19 vaccine doses directly or through COVAX by mid-2022.
 - As of 6 December 2021, 353.4 million doses have been shared by member states, of which only 118 million have already been delivered- 72.7 through the COVAX mechanism, 45.2 through bilateral donations
- **Africa is the largest recipient of vaccine doses delivered by Team Europe member states through COVAX (39.5 million).**
- **In terms of bilateral donations, Africa is only second to the Asia and Pacific region (15.3 and 24 million, respectively).**

A key challenge: In Africa, multiple distribution bottlenecks

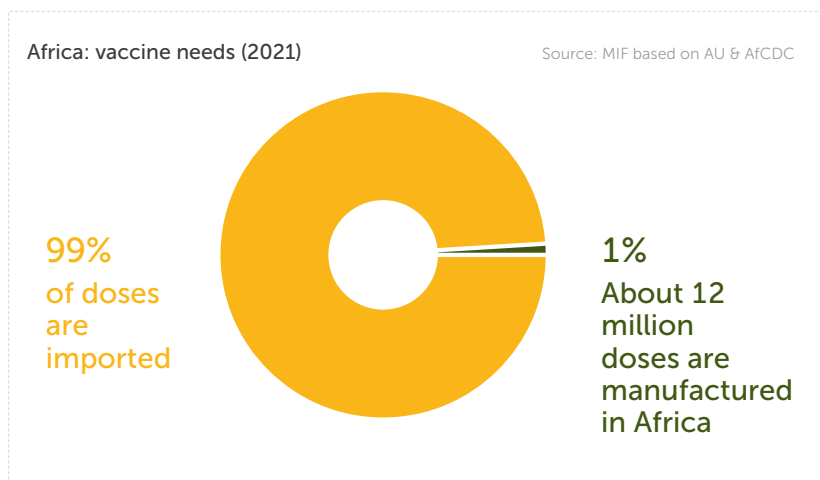
- **Health workers:** Only health workers with specialised training can administer vaccines, as several of the COVID-19 vaccines pose additional challenges even for trained health workers, such as requirement to be removed/unpacked from ultra-cold chain refrigeration or mixing in-situ.
- **Basic equipment shortages:** A shortage of syringes – in particular a 0.3ml syringe version required to deliver the Pfizer dose – is slowing delivery in many places according to the WHO.
- **Vaccine hesitancy:** Over the past few years, there has been a growing surge of vaccination refusal. Due to the speed with which the COVID-19 vaccines have been developed, people have raised additional concerns about safety and efficacy.
- **Last mile and reaching rural and marginalised communities:** Any mass vaccine campaign requires refrigerated vehicles, cold chain packaging, tracking and visibility tools, as well as relevant transport networks.

4. The long-term challenge: Building Africa's vaccine autonomy

An obvious case: Africa accounts for 25% of the global vaccine demand but currently imports 99% of its routine vaccine needs

- About 99% of Africa's routine vaccines are imported, most of them supplied by a few developing-country vaccine manufacturers (DCVMs), with the support of Gavi, the Vaccine Alliance, and UNICEF. The majority of these DCVMs are Indian manufacturers, such as Bharat Biotech, BioMed and the Serum Institute of India.

Vaccine manufacturing supply capacity in Africa



Currently, African vaccine manufacturing capacity is almost null

At global level, vaccine manufacturing is concentrated in developed countries, and India

- About 70% of global vaccine drug substance manufacturing sites are located in Western Europe (40%) and North America (30%).
- Global vaccine production is mostly concentrated in Asia with about 42% of vaccines produced by three manufacturers (Bharat Biotech, BioMed and the Serum Institute of India).

In Africa, only 10 local vaccine value chain players are currently operating

- The ten local vaccine value chain players are located in Nigeria (2), South Africa (2), Algeria (1), Egypt (1), Ethiopia (1), Morocco (1), Senegal (1) and Tunisia (1).
- About 40% engage only in packaging and labelling, and 40% only in fill and finish.
- Only five engage in some degree of drug substance manufacturing, but mostly on a very small scale.
- Research & Development (R&D) capacities are limited to South Africa and Nigeria.

Recent developments in vaccine manufacturing in Africa

COVID-19 vaccine manufacturing is expected to ramp up in 2022 in Africa, increasing the availability of vaccines on the continent. A number of important developments are currently underway:

- South Africa's Biovac Institute is expected to begin partial manufacturing of the Pfizer COVID-19 vaccine this year. At full operational capacity, it is expected to produce over 100 million doses annually.
- Construction of BioNtech's first manufacturing site for messenger RNA (mRNA) vaccine on the continent is also scheduled to begin this year. Rwanda and Senegal signed an agreement with the company in October, but the final decision on the location of the facility has yet to be made.
- Egypt is expected to increase production of Sinovac's COVID-19 vaccine, with up to 2 billion additional doses annually.
- Algeria, Egypt, Morocco, Rwanda, Senegal, and South Africa either signed agreements for COVID-19 vaccine manufacturing or began production in 2021. Other countries such as Côte d'Ivoire, Ghana, Kenya, and Nigeria have also shown interest in manufacturing.
- In South Africa, a technology transfer hub for mRNA COVID-19 vaccines is expected to review expressions of interest from manufacturers on the continent in 2022 and to start production of a vaccine for clinical studies.

The Partnership for African Vaccine Manufacturing (PAVM)

The launch of the PAVM constituted the major outcome of the 12-13 April 2021 emergency Summit on Vaccine Manufacturing in Africa, co-hosted by the AU and the Africa Centres for Disease Control and Prevention (AfCDC). The PAVM aims to deal with the continent's general vaccine needs **by 2040**, with the following roadmap:

- Vaccines for known African pathogens: local production of 100% of vaccines needed for at least 1-3 emerging diseases such as Ebola, Lassa fever and Rift Valley fever.
- Vaccines for unknown global pathogens: local capacity to manufacture 30-60% of vaccines needed for a pandemic.
- Routine immunisation: local capacity for 60% of annual production of routine vaccines needed.

Multiple challenges to address on the road to Africa's vaccine manufacturing autonomy

Intellectual Property Rights/technology transfers

World Trade Organization's (WTO) TRIPS framework (Trade-Related Aspects of Intellectual Property) regulates trade-related intellectual property matters, including patents. To increase access to COVID-19 vaccines, in October 2020 South Africa and India proposed a temporary waiver of TRIPS patent rights to allow wider production of COVID-19 vaccines and other medical products. Even if in May 2021 the US backed the proposal, several developed countries are still opposing the waiver under the allegation that most of the world's developing countries do not have adequate manufacturing capacity for COVID-19 vaccines yet. WTO's 12th Ministerial Meeting has been postponed from 30 November 2021 to March 2022 due to the Omicron variant emergency, and WTO's Council for TRIPS remains engaged on the matter in various configurations.

Two alternatives to the TRIPS waiver are already possible within current provisions:

- **Voluntary licensing agreements (VLAs)** enable a patent holder to allow others to manufacture, import, and/or distribute its patented products.
- **Compulsory licenses (CLs)** enable governments to allow others to manufacture, import and/or distribute patented products without the consent of the patent owner.

Ensuring the relevant market size

A sustainable approach to developing vaccine manufacturing capacities requires reliable demand for large volumes to support the production scale required to be cost-competitive. The Gavi and UNICEF Supply Division (SD) procurement mechanism has been envisaged as a pooling arrangement to meet this requirement, through sizable procurements with well-managed processes. Non-Gavi-supported countries often procure at higher prices, as they typically are unable to buy in the volumes that Gavi does or with the same reliable patterns. A solution would be for non-Gavi countries to pool their procurement to aggregate demand. Africa has been successful with this tactic, such as for COVID-19-related personal protective equipment and vaccines (e.g., 400 million doses of the Johnson & Johnson vaccine).

Governance/regulatory/quality control frameworks

While continental and regional regulatory reform related to COVID-19 vaccines is ongoing, continent-wide harmonisation under the African Medicines Agency (AMA) is not yet a reality and national regulators face capacity constraints. To ensure Africa's vaccine manufacturing capabilities are scaled up, a pan-African regulatory framework will be necessary.

Expertise/health workforce capacities/R&D

A few ongoing tech transfers have provided experience, but there are still skills shortages of pharmaceutical, biotechnology and industrial talent, driven by scarcity and specific important brain drain in that sector. Expertise and knowledge sharing will be key, as well as enhanced public investment into R&D.

Infrastructure environment

A fully reliable infrastructure is required for vaccine production, specifically at energy and water facility levels. Intracontinental transport facilities will also be key.

Access to finance, and partnerships with the private sector

Initial investments made in local vaccine manufacturing have included the use of non-traditional financing models such as public-private partnerships (PPPs) and joint ventures, and several partnerships and investments related to COVID-19 vaccine manufacturing have been announced recently. These will need to be enhanced and expanded, and allow for relevant risk-sharing.

The Team Europe Initiative (TEI) on Manufacturing and Access to Vaccines, Medicines and Health Technologies in Africa (MAV+)

On 21 May 2021 at the G20 Global Health Summit in Rome, the President of the European Commission Ursula von der Leyen announced the Team Europe Initiative (TEI) on Manufacturing and Access to Vaccines, Medicines and Health Technologies (MAV+) in Africa, to be a key pillar of the 6th AU/ EU Summit.

This initiative will work at continental, regional and national levels to **strengthen the African pharmaceutical system and the regional manufacturing capacities**. It is backed by **€1 billion from the EU budget and the European development finance institutions such as the European Investment Bank (EIB)**. **This amount will be further enhanced by additional contributions from member states.**

MAV+ is an integrated and comprehensive support package that aims to tackle barriers to manufacturing and access to health products and technologies in Africa under three dimensions: supply side (manufacturing); demand side (market creation); enabling environment (regulation and governance of pharmaceutical policies; human capital development; supply chain management and integrity; research and scientific cooperation).

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